# **AICTE MENDATORY DISCLOSURE**

## 1. Name of the Institution:

NAME	UNIVERSITY OF KALYANI, DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Address	UNIVERSITY OF KALYANI
	WEST BENGAL,
	PIN -741235
Telephone	3325809617
Mobile	
Email	

- 1. Name and Address of the Trust/Society/Company and the Trustees:NA
- 2. Name and Adress of the Principal: Dr.Debansu Roy, Telephone: 03325828750
- 3. Name of the affiliating University: NA
- 4. Governance:
  - **a.** Members of the Board and their brief background:
- 1. Prof. (Dr.) Sankar Kumar Ghosh **Vice-Chancellor & Chairman of Executive Council** University of Kalyani 2. Prof. Abhijit Chakrabarti **Professor & Head, Crystallography and molecular Biology Division** Saha institute of Nuclear Physics Room no. 307, Sector-1, Block AF Bidhan Nagar, Kolkata-700064 3. Prof. B. K. Bajpai Professor of Economics and Director of Girl Institution of Development Studies Sector - 'O', Aliganj, Lucknow - 226024, India 4. Prof. Rita Ghosh The Dean, PG Faculty of Science, University of Kalyani 5. Prof. Tapan Kumar Biswas The Dean, PG Faculty of Arts & Commerce University of Kalyani 6. Prof. Utpal Biswas The Dean, PG Faculty of Engg. Tech. & Management University of Kalyani 7. Shri Bidyut Nandi **Financial Advisor Department of Finance Government of West Bengal** Nabanna, Mandirtala, Howrah 8. Shri Nityananda Mandal, IAS **Commissioner, Higher Education Department** Govt. of West Bengal Bikash Bhavan, Salt Lake Kolkata – 700091 9. Dr. madhumita Manna

Principle, Bidhannagar College, Bidhan, Kolkata-700064

- 10. Professor Goutam Paul Department of Physiology, University of Kalyani Nominee of the Chairman, West Bengal State Council of Higher Education
- 11. Prof. Samares Pal Head, Department of Mathematics, University of Kalyani
- 12. Prof. Samir Kr. Mukherjee Head, Department of Microbiology, University of Kalyani
- 13. Smt. Minakshi Sarkar Head, Department of Modern Language, University of Kalyani
- 14. Dr. Manabi Bandhyopadhya Principle, Krishnagar Women's College, Krishnagar, Nadia-741101
- 15. Dr. Sasim Kabiraj Thakur Principle, Union Christian Training College(UCTC) Baharampur, Murshidabad – 742101
- 16. Dr. Swagata Das Mohanta Principle, Chakdah College Chakdah, Nadia-741222
- 17. Dr. Asok Kumar Das Principal, Asannagar Madan Mohan Tarkalankar College Asannagar, Nadia-741161
- 18. Dr. Sujata Bagchi banerjee Principal, Krishnath College, Berhampore, Murshidabad-742101
- 19. Prof. Debansu Ray Registrar, Kalyani University & Non-member Secretary
  - b. Members of Academic Advisory Body:
    - 1. Faculty of ETM: Prof. Utpal Biswas, Dean, ETM
    - 2. All the professor under ETM Faculty:

Faculty Name	Designation
Dr. Jyotsna Kumar Mandal	Professor
Dr. Utpal Biswas	Professor
Dr. Priya Ranjan Sinha Mahapatra	Associate Professor
Dr. Anirban Mukherjee	Professor
Dr. Kalyani Mali	Professor
Dr. Debabrata Sardar	Assistant Professor
Sukanta Majumdar	Assistant Professor

- **c.** Frequently of the Board Meeting and Academic Advisory Body: Once in a month or 12 times in a year at least of Board Meeting and At least 5 times in a year for Advisory Body.
- **d.** Organizational chart and processes: http://www.klyuniv.ac.in/index.php/about-uok/organization-chart
- e. Nature and Extent of involvement of Faculty and students in academic affairs/improvements: Environment is more like democratic
- **f.** Mechanism/ Norms and Procedure for democratic/ good Governance : It is as per the university rule.
- **g.** Student Feedback on Institutional Governance/ Faculty performance: Yes, It is taken regularly.
- **h.** Grievance Redressal mechanism for Faculty, staff and students: Yes, It is available.

- i. Establishment of Anti Ragging Committee : Yes, It is available.
- **j.** Establishment of Online Grievance Redressal Mechanism : Yes, It is available.
- **k.** Establishment of Grievance Redressal Committee in the Institution and Appointment of OMBUDSMAN by the University

Committe	Appointment	Date of	Name	Profess	Addres	Associa	email
е Туре	order Reference	Appoint		ion	S	ted	
	number	ment				with	
OMBUDS	R/Estab/Extn./18	25/5/201	Sushil	Advoca	Univer	Univers	sushilsaha14@gm
MAN	/DP-415	8	Kuma	te	sity of	ity of	ail.com
			r Saha		Klayani	Klayani	
Grievance	RPS/N/48/1590/	30/11/20	Deba	Princip	Univer		register@klyuniv.
Redressal	2016/S-890	16	nsu	al	sity of	Univers	ac.in
			Roy		Kalyani	ity of	
						Kalyani	

- I. Establishment of Internal Complaint Committee (ICC)
- **m.** Establishment of Committee for SC/ ST : Yes, It is available.
- n. Internal Quality Assurance Cell:

	Check Wice Chancellor University of Kalvani	-Chairman
1.	Prof. Sankar Kumar Gnosh, vice Chancehor, Oniversity of Ital	-Director
2.	Prof. J. K. Mandal, Department of Computer Sc & Eligg, KO	Momber
2	Prof. Rita Ghosh, Dean, Faculty of Science, KU	- Member
J.	Prof Sumit Mukeriee Department of Political Sc., KU	- Member
4.	FIOL Sullin Hukerjee, Department of Chemistry K II	- Member
5.	Prof. Nilasish Nandi, Department of Chemistry, N.C.	- Member
6.	Prof. A.K. Panigrahi, Department of Zoology K.U	Manahan
7	Prof Manas Kumar Sanval, Department of Business Administration, KU	- Member
/.	Prof. Sweti Do Department of Chemistry, K.U.	- Member
8.	Prol. Swell De, Department of Chemisery, Last	- Member
9.	Dr. Sudipta Roy, Associate Professor, Dept. of Botany	K II- Member
10	. Dr. Anirban Mukhopadhyay, Department of Computer Sc. & Engineering,	K.U- Member
-1-1	Registrar University of Kalvani	- Member
11	Lugartan of Collogon University of Kalvani	- Member
12	. Inspector of Coneges, Oniversity of Kalyani	- Member
13	. Development Officer, University of Kalyani	

## 6. Programmes

Name of Programmes approved by AICTE	MCA,MTECH(CSE)
Name of Programmes Accredited by AICTE	MCA,MTECH(CSE)

NI-2-2-2	Number	Duration	C	<b>F</b> = =	Discourses	C
Name	Number of	Duration	Cut off	Fee	Placement	Campus
	seats		marks/rank		Facilities	placement
			of			in last three
			admission			years with
			during the			minimum
			last three			salary,
			years			maximum
						salary and
						average
						salary
MTECH	10	2vr		24000(GATE) per		Placed-10.

			annum	Min Salary-
			40000(non_Gate)	2 lakh(per
			per annum	annum)
				Max Salary-
				4 Lakh(per
				annum)
				Average
				salary-2.5
				Lakh(per
				annum)
MCA	15	3yr	21710 per	Placed-35.
			annum	Min Salary-
				1.5 lakh(per
				annum)
				Max Salary-
				4 Lakh(per
				annum)
				Average
				salary-2.5
				Lakh(per
				annum)

### 7. Faculty:

Faculty	Permanet	Adjunct
Dr. Jyotsna Kumar Mandal	Yes	
Dr. Utpal Biswas	Yes	
Dr. Priya Ranjan Sinha	Yes	
Mahapatra		
Dr. Anirban Mukherjee	Yes	
Dr. Kalyani Mali	Yes	
Dr. Debabrata Sardar	Yes	
Sukanta Majumdar	Yes	

- Permanent Faculty: Student Ratio: 1:16
- Number of Faculty employed and left during the last three years: employed: 1

## 8. Profile of Principal:

- i. Name Dr. Debansu Roy
- ii. Date of Birth 23/12/1966
- iii. Unique id AFXPR8250D (PAN ID)
- iv. Education Qualifications Ph.D in Economics, M.A. in Economics.
- v. Work Experience
  - Teaching 16 years
  - Research 16 years
  - Industry -
  - Others -

vi. Area of Specialization - Economics

vii. Courses taught at Diploma/ Post Diploma/ Under Graduate/ Post Graduate/ Post Graduate Diploma Level -

viii. Research guidance

- No. of papers published in National/ International Journals/ Conferences -
- Master -
- Ph.D. -

ix. Projects carried out -

- x. Patents NA
- xi. Technology Transfer NA
- xii. Research Publications -

All Other Faculties:

Dr. Jyotsna Kumar Mandal	Details
Dr. Utpal Biswas	http://kucse.in/faculties.html
Dr. Priya Ranjan Sinha Mahapatra	http://kucse.in/faculties.html
Dr. Anirban Mukherjee	http://kucse.in/faculties.html
Dr. Kalyani Mali	http://kucse.in/faculties.html
Dr. Debabrata Sardar	http://kucse.in/faculties.html
Dr. Jyotsna Kumar Mandal	http://kucse.in/faculties.html
Sukanta Majumdar	http://kucse.in/faculties.html

## 9. Fee

SI.	Particulars	MCA	M.Tech
No.			CSE

1	Admission Fee ( one time ) *	500.00	500.00
2	Tuition/ Course Fee (yearly)	20000.00	#24000.00
3	Library Fee (one time) non refundable	80.00	80.00
4	Sports Fee ( one time )	50.00	50.00
5	Laboratory Fee (p.a.)	200.00	200.00
5a	Computer Fee + Internet Facility (annual)	100.00	100.00
6	Session Fee (p.a.)	100.00	100.00
7	Registration Fee (one time), if applicable**	100.00	100.00
8	Student Health Home ( p.a. )	10.00	10.00
9	Fee for Identity Card ( o ne time )	30.00	30.00

	TOTAL (including sl. no	o. 7 & 10 )	22750.00	26750.00
14	Examination Fee (p.a.) (for t	wo semesters )	1200.00	1200.00
13	Prospectus & University Inform	nation	200.00	200.00
12	Students ' Aid Fund ( o	ne time )	50.00	50.00
11	Development Fee ( p.a.)		100.00	100.00
10	Immigration Fee** (one tin	me), if applicable	30.00	30.00

- # For NET and GATE qualified students Rs. 24,000.00 and for Non NET/ GATE students Rs. 40,000.00 and for Sponsored students Rs. 50,000.00
- \*\* Registration Fee and Immigration Fee are applicable in case of students who have done graduation from any University other then University of Kalyani.
  - Time schedule for payment of fee for the entire programme:
  - No. of Fee waivers granted with amount and name of students: NA
  - Number of scholarship offered by the Institution, duration and amount:0
  - Criteria for fee waivers/scholarship: NA
  - Estimated cost of Boarding and Lodging in Hostels: Boarding 1200/year

## 10. Admission:

Number of seats sanctioned with the year of	MCA-15,Mtech-10
approval	
Number of Students admitted under various	MCA-
categories each year in the last three years	MTECH-
Number of applications received during last two	NA
years for admission under Management Quota	
and number admitted	

## 11. Admission Procedure:

Course Name	Admission	Address	Test Agency	URL
	Procedure			
MCA	JECA	KOLKATA	WBJEE	
MTECH	University	Kalyani University	Kalyani University	
	Entrance Exam			

• Number of seats allotted to different Test Qualified candidate separately (AIEEE/ CET (State conducted test/ University tests/ CMAT/ GPAT)/ Association conducted test)

Program	Test Type	Seat Alloted
MCA	JECA	15
MTECH	University Test	10

## 12. Criteria and Weightages for Admission:

## For Mtech:

1<sup>st</sup>class B.Tech. / B.E. in Computer Science & Engineering / Computer Science & Technology / Information Technology.

Or

1<sup>st</sup> class MCA [Preceded by B.Sc. with Honours (45% marks) in Physics / Mathematics / Statistics / Computer Science / Electronic Science or 1<sup>st</sup> class BCA (Marks 45% for SC / ST and 54% for OBC) or any B.E. / B.Tech.]

Or

1<sup>st</sup> class M. Sc. in Computer Science or equivalent degrees

## For MCA:

Graduate or equivalent degree under (10+2+3) pattern in any discipline of a UGC recognized University/Institute or AICTE recognized BE/B.Tech/BCA of a University/Institute.

Candidate must have Mathematics as one of the subject at each level of education.

Candidates have to secure 60% marks (45% mark for SC/ST/OBC-A/OBC-B candidates) at each level of education.

## 13. List of Applicants

## Mtech List:

Serial	Application No	Name	Category	Gate	Gate	Total Score
No				Appear	APPEARING	out of
				Status	YEAR	(50+30+20)
1	APP/CS/27/127187	PRSSANTA DUTTA	GEN	YES	2018	58.799
2	APP/CS/06/25/523031	PRITAM GHOSH	GEN	YES	2018	54.399
3	APP/CS/06/24/254108	SUBHRANIL	GEN	YES	2018	49.2
		MUSTAFI				
4	APP/CS/06/28/400596	AVIROOP SARKAR	GEN	YES	2018	48.399
5	APP/CS/06/70/411694	KRISNA SHARMA	GEN	YES	2018	47.5
6	APP/CS/06/27/531788	SUVRIMA DATTA	GEN	YES	2018	43.899
7	APP/CS/06/25/567291	SANDIPAN KAR	GEN	YES	2018	42.801
8	APP/CS/06/21/192850	MONISH MUKUL	GEN	NO		41
		DAS				
9	APP/CS/06/24/285207	RANJAN KUMAR	GEN	YES	2018	40.5
		SHAW				
10	APP/CS/06/25/371748	ARITRA MITRA	GEN	NO		38
11	APP/CS/06/28/924433	TANUSRI GHOSH	GEN	YES	2018	35.5
12	APP/CS/06/25/13319	APARNA	GEN	YES	2018	34.599
		PRAMANIK				
13	APP/CS/06/19/947684	DEBADRITA	GEN	NO		33.5
		GHOSH				
14	APP/CS/06/25/598571	AMRIT KUMAR	GEN	YES	2018	33.201
15	APP/CS/06/26/606628	MD SAMIM	GEN	NO		31.5
		RAHAMAN				
16	APP/CS/06/22/264899	PUJA SAHA	GEN	NO		31
17	APP/CS/06/26/372190	SUBHODIP	GEN	NO		29
		CHAKRABORTY				
18	APP/CS/06/26/261088	MOU DUTTA	GEN	YES	2018	27.9
19	APP/CS/06/22/503176	RIMPA ROY	GEN	NO		27.5
20	APP/CS/06/21/738069	ABHIJIT MITRA	GEN			27.5

21	APP/CS/06/26/490752	RONI	GEN	NO	23
		BHATTACHARYA			
22	APP/CS/06/22/119000	SHRISTI DEY	GEN	NO	20
23	APP/CS/06/27/569318	ABIR SEN	GEN	NO	18.5
24	APP/CS/06/21/606861	SHUBHAMOY	GEN	NO	18.5
		SARKAR			

## 14. Results of Admission under management seats: NA

## 15. Information of Infrastructure and Other Resources Available

• Class and Tutorial Room, Laboratory, Drawing Hall Information

Room No	Room Type	Carpet area(in
	(Mension class room/lab/toilet, etc	sq m)
CS-101	Class room	38.43
CS-102	Class room	38.43
CS-202	Class room	41.71
CS-303	Class room	41.71
CS-207	Class room	62.625
LB-201	Computer Lab	59.17
LB-301	Computer Lab	60.41
TR-203	Tutorial room	7.5
SH-101	Seminar Hall	140
LB-205	Communication Lab	26.075
LB-206	Sensor Network Lab	26.82
LAB209	Laboratory	32.85
LB-201	Laboratory	59.17
LB-301	Laboratory	60.101
A101	Class Room	91.5
A102	Laboratory	23.1
A103	Workshop	200
A203	Laboratory	31.17
A204	Laboratory	38
B101	Drawing Hall	92.5
B102	Class Room	34.5
B103	Class Room	46
B104	Laboratory	50
B105	Class Room	50
B106	Class Room	37.4
B201	Laboratory	119
C101	Tutorial Room	28
CR201	Tutoral Room	60.48
C102	Tutorial Room	43.6

- Fire Safety Certificate: In process
- Library Information

No of Books	No of Titles	No of Volumes	No of National	No of
			Journal	International
			Subscriptions	Journal

				Subscription
150000	3292	70370	0	10

- Laboratory and Workshop
  - o List of Major Equipment/Facilities in each Laboratory/ Workshop
    - 1. Two HP Work station
    - 2. Digital Electronics Trainer Kits
    - 3. Advance PC for Software Development
    - 4. VLSI Design Simulator : Cogenda
    - 5. Wireless Sensor Network Equipment
    - 6. Arduino Kit
  - o List of Experimental Setup in each Laboratory/ Workshop
    - 1.
    - 2.
- Computing Facilities

Internet	Number of	Configurations	Number of	Number of	Major	Special
Bandwidth	Systems		systems	Systems	Software	Facilities
			connected	connected	Packages	
			by LAN	by WAN		
1Gbps	100	17,15,i3 core,	100	100	VLSI	
		4GB RAM, 1TB			Simulator	Wifi
		HDD			Cogenda ,	Throughout
					Office ,	Campus
					Microsoft	
					Professional	

- Innovation Cell: NA
- Social Media Cell: NA
- Compliance of the National Academic Depository (NAD), applicable to PGCM/ PGDM Institutions and University Departments: NA
- List of Facilities Available:
  - Games and Sports Facilities: Recreation Hall, Basket Ball court, Cricket Ground, Football ground, Badminton court
  - Extracurricular Activities: Academic Festival, Social, Cultural Activities, NCC
  - Soft Skill Development Facilities: NA
- Teaching Learning Process:
  - Curricula and syllabus for each of the programs as approved by the University:

MCA Syllebus:

Semester I											
Paper	Paper Name	Weekly C	eekly Contact Period (WCP) Cre			Credit		Marks			
Code		Lecture	T#	P <sup>#</sup>	Total		S <sup>#</sup>	Exam.	Total		
Theoretica	l										
CSE 101	Advanced Operating Systems	4	0	0	4	4	20	80	100		
CSE 102	Soft Computing & Digital Image	4	0	0	4	4	20	P-20 Th-60^	100		
	Processing										
CSE 103	Advanced Mathematics	4	0	0	4	4	20	80	100		
CSE 104	Advanced Computer Architecture	4	0	0	4	4	20	80	100		
CSE 105	Advanced Design and Analysis of	4	0	0	4	4	20	80	100		
	Algorithm										
Practical	# T – Tutorial, F	P – Practica	l, S – S	Session	al, ^Th –	Theory, A	A - Ass	signment			
CSE 101 L	Soft Computing & Image Processing	-	-	6	6	4	20	A-20,P-50,V-30	100		
	Lab.										
	Total Credit: 24 Total Marks: 600										
		Se	meste	r II							
Paper	aper Paper Name Weekly Contact Period (WCP) Credit Marks										

Code		Lecture	Т	Р	Total		S	S Exam.			
Theoretical		•									
CSE 201	Advanced Network Security & TCP/IP Programming	4	0	0	4	4	20	P-20	Th-60	100	
CSE 202	Mobile & Wireless Computing	4	0	0	4	4	20	8	0	100	
CSE 203	Advanced Database System	4	0	0	4	4	20	P-20	Th-60	100	
CSE 204 E	Elective I(CS)	4	0	0	4	4	20	8	0	100	
CSE 205 E	Elective II (IT)	4	0	0	4	4	20	8	0	100	
Practical	· · · ·	-									
CSE 201 L	Advanced Communication Lab.	0	0	6	6	4	20	20 A-20,P-50,V-30			
						Total	Credit	: 24	Fotal Mar	ks: 600	
		Se	meste	r III							
Paper	Paper Name	Weekly C	ontact	Period	(WCP)	Credit		M	arks		
Code		Lecture	Т	Р	Total		S	Ex	am	Total	
Theoretical											
CSE 301	Remote Sensing GIS, GPS	4	0	0	4	4	20	0 80		100	
CSE 302 E	Elective III (CA)	4	0	0	4	4	20	P-20	Th-60	100	
CSE 303 D	Thesis I	-	-	18	18	12	R-10	R-100, P-100, V-100* 300			
Practical	* R-Repo	rt. P- Preser	ntation	. V - Viv	а						

						Total	Credit	:24	Total Mar	ks: 600
		Ser	neste	r IV						
Paper Code	Paper Name	Weekly Contact Period (WCP) Credit				N	Marks			
		Lecture T P Total					Viva	Total		
Dissertation										
CSE 401D	Thesis II	-	1	24	24	16	200	100	100	400
CSE 402S	Seminar	-	-	-	-	6	30	30	40	100
CSE 403GV	Grand Viva	-	-	-	-	6	-	-	100	100
						Total	Credit	: 28	Total Mar	ks: 600

6

6

4

20 A-20,P-50,V-30

100

Total Marks for Two Year (4-Semesters) M. Tech.(CSE) Course is 2400, Total Credit is 100.

Satellite Image Processing & GIS Lab

For sessional at least two intermediate exams are to be taken, average mark will be the sessional marks for each subject. Corrected paper of these intermediate exams is to be returned to the respective students. Topic must be different for each students in Seminar.

#### Elective I(Computer Science(CS)) Elective II(Information Technology(IT)) Elective III(Computer Application(CA)) Parallel Architecture/Processing and I.Web Mining and Internet Technology Bioinformatics Grid Computing II.Data Warehousing and Data Mining II. Artificial Intelligence and Expert Systems Theory of Programming П. **III.**Management Information Systems III. VLSI Technology Languages/Computing IV.Advanced Software Engineering IV. Speech & Natural Language Processing Real Time Systems III. V.Data Compression & Error Correction V. Network Administration IV. Pattern Recognition VI.Optical Networks VI. Cloud Computing VII.Embedded Systems VII. Authentication & Steganography VIII.Business Intelligence VIII. Software Architecture IX. Green Computing

- □ Introduction overview of operating system concepts Process management and Scheduling , Memory management : partitioning, paging, segmentation, virtual memory, Device and File management.
- Distributed Systems Hardware and Software concepts Design issues; Communication in Distributed systems : Layered protocols - ATM networks - Client Server model – Remote Procedure Calls.
- Synchronization : Clock synchronization Mutual exclusion Election algorithms, Atomic transactions Deadlocks;
   Processes : Threads System models processor allocation Scheduling Fault tolerance Real time distributed systems.
- □ Shared memory : Consistency models Page based distributed shared memory Shared variables Object based distributed shared memory; Distributed File Systems : Design and Implementation.
- Case Study: Introduction to Amoeba Object and Capabilities memory management Communication Amoeba Servers.

## **TEXT BOOKS**

CSE 301 L

• Andrew S Tanenbaum , " Distributed Operating Systems " , Pearson Education India, 2001.

## **REFERENCE BOOKS**

- Mukesh Singhal, Niranjan G Shivratri , " Advanced Concepts in Operating Systems", McGraw Hill International, 1994.
- Pradeep K Sinha , " Distributed Operating Systems Concepts and Design ", PHI, 2002.

- □ Light,Luminance, Brightness and Contrast, Eye, Monochrome vision model, Image processing problems and applications, Vision, camera, Digital processing system, 2-D sampling theory, Aliasing, Image quantization, Lloyd Max Quantizer, Dither, Color images, Linear systems and shift invariance, Fourier Transform, Z-Transform, Matriz theory results, Block matrices and Kronecker products.
- □ 2-D orthogonal and Unitary transforms , 1-D and 2-D DFT , Cosine , Sine , Walsh Hadamard , Haar , Slant , Karhunen-loeve , Singular value decomposition transforms.
- □ Point operations contrast stretching, clipping and thresholding, density slicing, Histogram equalization, modification and specification, spatial operations spatial averaging, low pass, high pass, band pass filtering, direction smoothing, medium filtering, generalized ceptrum and homomorphic filtering, edge enhancement using 2-D IIR and FIR filters, color enhancement.
- □ Image observation models, sources of degradation, inverse and Wiener filtering , geometric mean filter , non linear filters , smoothing splines and interpolation , constrained least square restoration.
- □ Image data rates , pixel coding , predictive techniques , transform coding and vector DPCM. Block truncation coding , Wavelet transform coding of images, color image coding, Random transform , back projection operator , inverse random transform , back projection algorithm , fan beam and algebraic restoration techniques.

#### **TEXT BOOKS**

Anil Jain K. "Fundamentals of Digital Image Processing", PHI, 1999. William Pratt, "Digital Image Processing", Wiley Interscience, 2nd edition 1991

#### **REFERENCE BOOKS**

Gonzales, Rafael and Windz, "Digital Image Processing", 2nd edition, Addison-Wesley.,1998 Maner Sid-Ahmed A., "Image Processing", McGraw Hill International Edition, 1995. Andrion Low-"Introductory computer Vision and Image Processing", MCGraw Hill International Edition.

#### Soft Computing

**Fuzzy Logic and Approximate Reasoning**:

Conventional and fuzzy sets: Basic concepts of fuzzy logic

Fuzzy expressions: Basic principles of fuzzy logic and fuzzy inference rules, fuzzy relations, fuzzy operators, realization of fuzzy systems using fuzzy relations

Application of fuzzy logic in vision, pattern recognition, robotics and linguistics. Approximate reasoning in Experts Systems, Fuzzy sets in approximate reasoning, Fuzzy propositions in approximate reasoning. Transition Modifier rules, Basic principles of approximate reasoning and rules of inference.

Genetic Algorithms (GAs) : Introduction to GAs, Binary encodings of candidate solutions, Schema Theorem and Building Block Hypothesis, Genetic operators – crossover and mutation, parameters for GAs, Reproduction mechanism for producing Offspring, Darwinian Principle in evaluating objective function. Convergence Analysis: Simple GA schemes, Stochastic models: GA approaches to optimization problems.

Basic Concepts and Principles of Neural Networks (NNs) and Learning Systems.

Learning with GAs and Artificial NNs (ANNs); Composite use of Fuzzy Logic, ANNs and GAs.

- Neurocomputing: Models of Neurocomputing: (a) Perceptron Training, (b) Back propagation learning, (c) Hopfield nets, (d) Adaptive resonance theory I & II, (e) Self-organizing feature map, (f) ADALINE. Applications in pattern classification and image understanding.
- **Chaos Theory, Fusion of Neuro, Fuzzy, GA & Chaos theory &** Applications to simple problems.

#### Books:

- 1. David E. Goldberg: Genetic Algorithms in Search, Optimization and Machine Learning, Addision Wesley, MA, 1989.
- 2. S. Haykin: Neural Networks A Comprehensive Foundation, Macmillan College Publishing Company, New York, 1994.
- 3. H. J. Zimmermann: Fuzzy set theory and its application, 2nd revised edition, Allied Publishers Ltd.
- 4. G. J. Klir, B. Yuan: Fuzzy sets and Fuzzy logic: Theory and Applications, PHI, 1995.
- 5. R. L. Devaney: An Introduction to Chaotic Dynamical Systems, 2nd Ed. Addision Wesley, 1989.
- 6. An Introduction to Genetic Algorithms M. Mitchell.
- 7. Genetic Algorithms K. F. Man, K. S. Tang and S. Kwong.
- 8. Genetic Algorithms + Data Structures = Evolution Programs Z. Michalewicz.
- 9. Adaptation in Natural and Artificial Systems J. H. Holland.

- 10. Genetic Algorithms : for VLSI Design, Layout & Test Automation P. Mazumder and E. M Rudnick.
- 11. Neuro- Fuzzy and Soft Computing : A Computational Approach to Learning and Machine Intelligence J. S. R. Jang C. T. Sun and E. Mizutani.
- 12. Theory and Practice of Uncertain Programming B. Liu.
- 13. Fuzzy Logic for the Applications to Complex Systems W. Chiang and J. Lee.
- 14. Fuzzy Logic with Engineering Applications T. J. Ross.
- 15. Neural Network and Fuzzy Systems : A Dynamical Systems Approach to Machine Intelligence B. Kosko.

#### Subject Code:- CSE 103

#### **Advanced Mathematics**

Combinatorics: Multinominal theorem, principle of inclusion; Recurrence relations – classification, summation method, extension to asymptotic solutions for subsequences; Linear homogeneous relations, characteristic root method, general solution for distinct and repeated roots, non-homogeneous relations and examples, generating functions and their application to linear homogeneous recurrence relations, non-linear recurrence relations, exponential generating functions, brief introduction to Polya theory of counting.

Graph Theory: Graphs and digraphs, complement, isomorphism, connectedness and reachability, adjacency matrix, Eulerian paths and circuits in graphs and digraphs, Hamiltonian paths and circuits in graphs and tournaments, trees; Minimum spanning tree, rooted trees and binary trees, planar graphs, Euler's formula, statement of Kuratowskey's theorem, dual of planer graph, independence number and clique number, chromatic number, statement of Four-color theorem, dominating sets and covering sets.

*Logic*: Propositional Calculus- propositions and consecutives, syntax; Semantics- truth assignments and truth tables, validity and satisfiability, tautology; Adequate set of consecutives; Equivalence and normal forms; Compactness and resolution; Formal reducibility – natural deducation system and axiom system; Soundness and completeness.

*Introduction to Predicate Calculus*: Syntax of first order language; Semantics- structures and interpretation; Formal deductibility, First Order theory, models of a first order theory (definition only), validity, soundness, completeness, compactness (statement only), outline of resolution principle.

#### References

J.L. Mott, A. Kandel and T.P. Baker: Discrete Mathematics for Computer Scientists, Reston, Virginia, 1983.

D.F. Stanat and D.E. McAllister: Discrete Mathematics in Computer Science, Prentice Hall, Englewood Cliffs, 1977.

R.A. Brualdi: Introductory Combinatorics, North-Holland, New York, 1977.

- Reingold et al.: Combinatorial algorithms: theory and Practice, Prentice Hall, Englewood Cliffs, 1977.
- J.A. Bondy and U.S.R. Murthy: Graph Theory with Applications, Macmillan Press, London, 1976.
- N. Deo: Graph Theory with Applications to Engineering and Computer Science, Prentice Hall, Englewood Cliffs, 1974.
- E. Mendelsohn: Introduction to Mathematical Logic, 2<sup>nd</sup> Ed. Van-Nostrand, London, 1979.
- L. Zhongwan: mathematical Logic for Computer Science, World Scientific, Singapore, 1989.
- F.S. Roberts: Applied Combinatorics, Prentice Hall, Englewood Cliffs, 1984.
- J.P Tremblay and R. Manohar: Discrete Mathematical Structures with Applications to Computers.
- J.L. Gersting: Mathematical Structures for Computer Sciences.
- S. Lipschutz: Finite Mathematics.
- S. Wiitala: Discrete Mathematics A Unified Approach.
- C. L. Liu : Elements of Discrete Mathematics.
- K . D. Joshi : Foundation of Discrete Mathematics.
- S. Sahani : Concept of Discrete Mathematics.
- L. S. Levy : Discrete Structure in computer Science.
- J. H. Varlist and R. M. Wilson: A course in Combinatorics.

### Subject Code:- CSE 104

Soft Computing

#### Fuzzy Logic and Approximate Reasoning:

- 1. Conventional and fuzzy sets: Basic concepts of fuzzy logic
- 2. Fuzzy expressions: Basic principles of fuzzy logic and fuzzy inference rules, fuzzy relations, fuzzy operators, realization of fuzzy systems using fuzzy relations

3. Application of fuzzy logic in vision, pattern recognition, robotics and linguistics. Approximate reasoning in Experts Systems, Fuzzy sets in approximate reasoning, Fuzzy propositions in approximate reasoning. Transition Modifier rules, Basic principles of approximate reasoning and rules of inference.

**Genetic Algorithms (GAs) :** Introduction to GAs, Binary encodings of candidate solutions, Schema Theorem and Building Block Hypothesis, Genetic operators – crossover and mutation, parameters for GAs, Reproduction mechanism for producing Offspring, Darwinian Principle in evaluating objective function. Convergence Analysis: Simple GA schemes, Stochastic models: GA approaches to optimization problems.

Basic Concepts and Principles of Neural Networks (NNs) and Learning Systems.

Learning with GAs and Artificial NNs (ANNs); Composite use of Fuzzy Logic, ANNs and GAs.

- **Neurocomputing**: Models of Neurocomputing: (a) Perceptron Training, (b) Back propagation learning, (c) Hopfield nets, (d) Adaptive resonance theory I & II, (e) Self-organizing feature map, (f) ADALINE. Applications in pattern classification and image understanding.

4.

Chaos Theory, Fusion of Neuro, Fuzzy, GA & Chaos theory & Applications to simple problems.

#### Books:

- 1. David E. Goldberg: Genetic Algorithms in Search, Optimization and Machine Learning, Addision Wesley, MA, 1989.
- 2. S. Haykin: Neural Networks A Comprehensive Foundation, Macmillan College Publishing Company, New York, 1994.
- 3. H. J. Zimmermann: Fuzzy set theory and its application, 2nd revised edition, Allied Publishers Ltd.
  - G. J. Klir, B. Yuan: Fuzzy sets and Fuzzy logic: Theory and Applications, PHI, 1995.
- 5. R. L. Devaney: An Introduction to Chaotic Dynamical Systems, 2nd Ed. Addision Wesley, 1989.
- 6. An Introduction to Genetic Algorithms M. Mitchell.
- 7. Genetic Algorithms K. F. Man, K. S. Tang and S. Kwong.
- 8. Genetic Algorithms + Data Structures = Evolution Programs Z. Michalewicz.
- 9. Adaptation in Natural and Artificial Systems J. H. Holland.
- 10. Genetic Algorithms : for VLSI Design, Layout & Test Automation P. Mazumder and E. M Rudnick.
- 11. Neuro- Fuzzy and Soft Computing : A Computational Approach to Learning and Machine Intelligence J. S. R. Jang C. T. Sun and E. Mizutani.
- 12. Theory and Practice of Uncertain Programming B. Liu.
- 13. Fuzzy Logic for the Applications to Complex Systems W. Chiang and J. Lee.
- 14. Fuzzy Logic with Engineering Applications T. J. Ross.
- 15. Neural Network and Fuzzy Systems : A Dynamical Systems Approach to Machine Intelligence B. Kosko.

#### Subject Code:- CSE 104

**Advanced Computer Architecture** 

#### Subject Code:- CSE 105

**Design and Analysis of Algorithms** 

**Quick Review of basic concepts** - complexity measures, worst-case, average case and amortized complexity functions, model of computation.

Algorithm Design Paradigm - Divide and Conquer, Recursion, Greedy method, Dynamic programming. Role of Data Structures.

- Sorting and Selection Problems: Order Statistics, sorting methods, lower bounds.
- Searching and Selection Problems: Order Statistics, sorting methods, lower bounds.

**Searching and Set manipulation:** Searching in Static table - path lengths in Binary trees and applications, optimality of Binary search in worst case and average case, construction of weighted Binary Search tree. Searching in dynamic table - randomly grown binary search trees, AVL trees, (a, b) trees; Union-find problem -tree representation of set, weighted union and path compression, analysis and application.

**Hashing:** chaining, open addressing, universal hashing function.

**Graph algorithms:** Review of topological sort, connected and biconnected components, shortest paths, minimum spanning trees. Maximum matching, maximum-flow (Ford-Fulkerson).

**Arithmetic and Algebraic problems:** Integer multiplication, GCD, Polynomial evaluation, Matrix Multiplication, Lower Bounds. Introductory Stringology. Some geometric algorithms.

**NP-completeness:** Determinism and non-determinism, P, NP, NP-complete, Cook's theorem, Some NP-complete problems, Approximation algorithms. Notion of Randomization and Parallelism in algorithms.

#### Books:

- 1. T. H. Cormen, C. E. Leiserson and R. L. Rivest: Introduction to Algorithms, MIT Press, 1990.
- 2. U. Manber: Introduction to Algorithms, Addison-Wesley, 1989.
- 3. G. Brassard and P. Bartley: Algorithmics: Theory and Practice, Prentice Hall International 1996.
- 4. A. V. Aho, J. E. Hopcroft and J. D. Ullman: Design and Analysis of Algorithms, Addison-Wesley, 1974.

#### Subject Code:- CSE 201

Advanced Network Security & TCP/IP Programming

- □ Uniqueness Number Theory concepts Primality Modular Arithmetic Fermet & Euler Theorem Euclid Algorithm RSA Elliptic Curve Cryptography Diffie Hellman Key Exchange
- Digests Requirements MAC Hash function Security of Hash and MAC Birthday Attack MD5 SHA RIPEMD
   Digital Signature Standard Proof of DSS
- □ Authentication applications Kerberos Kerberos Encryption Techniques PGP Radix64 IP Security Architecture Payload Key management Web security requirements SSL TLS SET
- Resources Intruders and Intrusion Viruses and Worms OS Security Firewalls Design Principles Packet Filtering – Application gateways – Trusted systems – Counter Measures
- Protocols and standards OSI model TCP / IP protocol suite addressing versions underlying technologies.
- □ Classful addressing other issues subnetting supernetting classless addressing routing methods delivery table and modules CIDR ARP package RARP.
- □ Datagram fragmentation options checksum IP package ICMP messages, formats error reporting query checksum ICMP package IGMP messages, operation encapsulation IGMP package UDP datagram checksum operation uses UDP package.
- Services flow, congestion and error control TCP package and operation state transition diagram unicast routing protocols RIP OSPF BGP multicast routing trees protocols MOSPF CBT PIM
- □ Client server model concurrency processes sockets byte ordering socket system calls TCP and UDP clientserver programs – BOOTP -DHCP – DNS – name space, resolution – types of records – concept – mode of operation – Rlogin.

### **TEXT BOOKS**

• Behrouz Forouzan, "TCP/IP protocol suite ", 2nd edition, Tata McGrawhill..

#### **REFERENCE BOOKS**

• Douglas Comer, "Internetworking with TCP / IP", Vol – 1, PHI, 2000.

#### Subject Code:- CSE 202

Mobile & Wireless Computing

- Wireless Transmission-Wired and wireless, Mobility of users and equipments, Electromagnetic Spectrum, Radio and Microwave communication, Infrared and Millimeter waves, Legthwave Transmission.
  - **Satellite Network Architecture**-Satellite Orbits-GEO LEO, MEO. Inmarsat, Iridium, Odyssey, Global Star, Archimedes and other Satellite Networks.
    - Spread Spectrum and CDMA-Direct (pseudo-noise) and Frequency hopped Spread Spectrum. CDMA System.
  - Wireless LANs -MACA and MACAW protocols. Infrared LAN. Cellular Radio Systems-Paging, Cordless telephones, Analog Cellular telephones AMPS. Digital Cellular Telephone-GSM. Personal Communication service (PCS).

### **CDPD** system.

- Mobile Data Networks and their applications.
- Wireless and Mobile access to the Internet.

#### **Books:**

- 1. V. K. Garg & J. E. Wilks: Wireless and Personal Communication Systems: Fundamentals and Applications, IEEE Press and Prentice Hall, 1996.
- 2. T. S. Rappaport, B. D. Werner and J. H. Reed: Wireless Personal Communications: The Evolution of PCS, Dkyener Academic, 1996.
- 3. G. I. Stuber: Principles of Mobile Communication, Kluener Academic, 1996.
- 4. U. Black: Mobile and Wireless Networks, Prentice Hall PTR, 1996.

#### Subject Code:- CSE 203

Advanced Database Systems

- Relational Database Management Issues Transaction Processing, Concurrency, Recovery, Security and Integrity.
- **Distributed Databases** Storage structures for distributed data, data fragmentation, Transparency of distributed architecture, Distributed query processing, Transaction management in distributed environment, Recovery and Concurrency control, Locking protocols, Deadlock handling, Dynamic modeling of distributed databases, Client Server Databases.

Performance Tuning, Advanced Transaction Processing.

**Object-oriented Databases** - Objects and Types, Specifying the behavior of objects, Implementing Relationships, Inheritance.

- Sample Systems.
  - New Database Applications.

**Multimedia Database** - Multimedia and Object Oriented Databases, Basic features of Multimedia data management, Data Compression Techniques, Integrating conventional DBMSs with IR and Hierarchical Storage Systems, Graph Oriented Data Model, Management of Hypertext Data, Client Server Architectures for Multimedia Databases

#### Books:

- 1. H. F. Korth & A. Silverschatz: Database Systems Concepts, McGraw Hill.
- 2. Bindu R. Rao: Object Oriented Databases, McGraw Hill, 1994.
- 3. Gray, Kulkarni, and Paton: Object Oriented Databases, Prentice Hall International, 1992.
- 4. Khoshafian: Object Oriented Databases, John Wiley & Sons, 1993.
- 5. S. Khoshafian & A. B. Baker, Multimedia and Imaging Databases, Morgan Kaufmann Publishers, 1996.
- 6. Kemper & Moerkoette: Object-Oriented Database Management, PH, 1994.
- 7. Alex Berson: Client/Server Architecture, McGraw Hill.

#### Subject Code:- CSE 301

**Remote Sensing GIS, GPS** 

- Introduction: Sun and atmosphere, Remote Sensing a historical perspective.
- Electromagnetic Radiations: EM radiators, polarization, attenuation.
- Thermal radiations, EM for remote sensing. Fundamental of Radiometry.
- Depresentation Physical Basics of Signatures: Signature OIR, TIR & Microware Region
- Remote Sensor: Classifications of Sensors, Sensor parameters.
- Resolution- Spatial & Spectral

Optical, Microwave Sensors

- Platform: Principle of Sattelite Motion, Types of orbit, Orbit perturbations.
- GPS Data Products: Dataformats, data product generation output media
- Date analysis: Visual analysis, Digital Classifications
- Application of Remote Sensing: Agriculture, Forestry, Land Cover Studies
  - Water Resource, Earth System Science
- Geographical Interaction System Application.

### Subject Code:- Elective I(CS - I)

Parallel Architecture/Processing and Grid Computing

- Parallel computer models: Multiprocessors and Multicomputer Multivector and SIMD computer PRAM & VLSI models, conditions of parallelism. System interconnect architectures performance. Metrics and Measures.
- Advanced processor technology Super scalar and vector processors Memory hierarchy technology, virtual memory technology cache memory organization shared memory organization.
- Linear pipeline processors Nonlinear pipeline processors Instruction pipeline design Arithmetic pipeline design Superscalar pipeline design.
- Multiprocessor system interconnects Cache coherence, Vector processing principle
   Compound Vector processing, SIMD computer organization, multiprocessor operating system, multiprocessor
- examples
  Grid Computing values and risks History of Grid computing Grid computing model and protocols overview of
- Grid Computing values and risks History of Grid computing Grid computing model and protocols overview of types of Grids

Desktop Grids : Background – Definition – Challenges – Technology – Suitability – Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight – application and Architecture – HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture.

- The open Grid services Architecture Analogy Evolution Overview Building on the OGSA platform implementing OGSA based Grids Creating and Managing services Services and the Grid Service Discovery Tools and Toolkits Universal Description Discovery and Integration (UDDI)
- Desktop supercomputing parallel computing parallel programming paradigms problems of current parallel programming paradigms Desktop supercomputing programming paradigms parallelizing existing applications Grid enabling software applications Needs of the Grid users methods of Grid deployment Requirements for Grid enabling software Grid enabling software applications.

Kai Hwang, "Advanced Computer Architecture", Parallelism, Scalability, Programmability, McGraw Hill, 1993.

Ahmar Abbas, "Grid Computing, A Practical Guide to Technology and Applications", Firewall media, 2004.

#### **REFERENCE BOOKS**

Hwang Briggs, "Computer Architecture and parallel processing", McGraw hill. William Stallings, "Computer Organization and Architecture- Designing for Performance", PHI,2000.

Joshy Joseph , Craig Fellenstein , "Grid Computing", Pearson Education , 2004. Foster , "Grid Blue print foe new computing".

#### Subject Code:- Elective I(CS - III)

**Real Time Systems** 

Real	Time	Systems
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- o Specification, Analysis, Design.
- o Definition, Types and Evolution;
- o State Diagram, Finite Automata, Timed Petri Net
- o Formal Methods for Analysis & Design.
- Algorithm Development
  - o Implementation of Real Time Algorithms
- o Debugging and Verification
  - **Real Time Distributed Computing** 
    - o Clock Synchronization, Real Time constraint satisfaction
    - o Reliability & Safety.
- Case Studies
  - o Computer Control Systems
  - o Real Time Simulation Systems
  - o Mission Control Systems
  - o Safety Critical Systems.

#### Subject Code:- Elective I(CS - IV)

**Pattern Recognition** 

- Bayes' Decision Theory, Discriminant functions and decision procedures, Relaxation procedures, Non-separable behavior.
- Parameter estimation and supervised learning, Maximum likelihood estimation, Sufficient statistics, Problems of dimensionality, Nom [Ara, etroc techniques, density estimates, Parzen Windows, k-nearest neighbour estimation, Fisher's linear discriminate.
- Clustering and unsupervised learning, Cluster validity, hierarchical and graph theoretic methods, Sealing.
  - Feature Selection-Karhunen Loeve, Stochastic approximation, kernel approximation, divergence measures.
- Syntactic Pattern Recognition, Inductive Learning, Grammatical Inference, Error correcting Parsing, Vapnik Chorvononkis result.

#### **Books:**

- 1. Tou & Gonzalez: Principles of Pattern Recognition, Addison Wesley.
- 2. B. D. Ripley: Pattern Recognition & Neural Networks, Cambridge University Press.
- 3. Tou & Gonzalez: Syntactic Pattern Recognition, Addison Wesley.

## Subject Code:- Elective II(IT - II)

- **Data Warehousing and Data Mining**
- Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data
- Mining systems, Major issues in Data Mining, Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining,
- Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation, Online Data Storage.

 Data Mining Primitives, Languages, and System Architectures: Data Mining Primitives, Data Mining Query Languages, Designing Graphical User Interfaces Based on a Data Mining Query Language Architectures of Data Mining Systems,

Concepts Description: Characterization and Comparison: Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

- Mining Association Rules in Large Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.
- Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy.
- Cluster Analysis Introduction :Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.
- Mining Complex Types of Data: Multidimensional Analysis and Descriptive Mining of Complex, Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series and Sequence Data, Mining Text Databases, Mining the World Wide Web.

#### **TEXT BOOKS:**

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India.

2. Data Mining Techniques – ARUN K PUJARI, University Press

3. Building the DataWarehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd..

#### **REFERENCE BOOKS:**

1. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.

2. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION

3. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION

4. Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON EDUCATION

## Subject Code:- Elective II(IT - IV)

#### **Advanced Software Engineering**

System Engineering - Analysis & Design
Software Architectures & Design.
Software Metrics.
Software Testing Strategies: Analytical models (e. g. Markov Chain Model, Probabilistic Models)
Software Reliability: Analytical Models
Formal Methods in Software Engineering (e. g. Formal Specification Language)
Software Re-use
<b>Re-engineering</b> - reverse engineering.
Real-time Software Engineering.
Client/Server Software Engineering.
CASE tool design & implementation.
Verification & Validation.
Object-oriented Software Engineering: OO-Analysis, OO-Design, OO-Testing, metrics for OO systems
System Modeling and Simulation.
Software Engineering Economics.

#### **Books:**

- 1. Pressman: Software Engineering, McGraw Hill.
- 2. Shoeman: Software Engineering, McGraw Hill.

#### Journals:

1. IEEE Transactions of Software Engineering (IEEE Press).

### Subject Code:- Elective II(IT -V)

**Data Compression & Error Corrections** 

Data Compressions

Introduction, Brief history, minimum redundancy codes, Shanon – Fanno code, Huffman code, Adaptive Huffman code, Arithmetic coding, Statistical Modelling, Dictionary based compression, Sliding window compression, Lz78 compression, Speech compression, Lossy Graphics compression.

Mathematical background, Linear codes, codes for high speed memories,- bit error correcting, byte error correcting. Codes for mass memories. Asymmetric and unidirectional error codes, codes for logic design. Recent development of error correcting codes. Books:

1. Error control coding for Computer stsystem by T.R.N Rao & E. Fujiwara, PHI Inc.

#### Subject Code:- Elective IV(CA -I)

## **Bioinformatics**

Machine learning foundations - probabilistic framework, algorithms Neural Networks and applications Hidden Markov Models - theory & Applications Probabilistic Graphical Models & Applications Phylogenetic trees Stotastic grammars & linguistics Microarrays & Gene Expressions Internet resources & pubic databases Information theory & statistics in bioinformatics HMM Techniques Goussian Process, Kernel Methods and support.

Books:

1. Bioinformatics -the machine learning Approach by Pierre Baldi and Soren Brunk Affiliated - East West Publications

#### Subject Code:- Elective III(CA -V)

**Network Administration** 

History - TCP/IP, UUCP network, Network through Linux & Maintenance

TCP/IP Networking: interfaces, IP Address, Address resolutions of tcp/ip. Configuring Serial devices Configutring Network Hardware

Names services, P-P Protocols, Firewall, IP Accounting, Network Information Systems

IP Masquerade, IPX and NCP file systems, managing UUCP, E-Mail, Senfd Mail, Networks and configurations, E-news

Book:

1. Linux Network Administrators guide by Olaf Kierch & Terry Dawson shroff Publidshers @& Distributores Pbvt. KLtd.

#### MTech:

Paper	Paper Name	Weekly C	ontact	Period	(WCP)	Credit		Marks	
Code		Lecture	Т	Р	Total		S	Exam.	Total
Theoretica	1							I	
MCA 101	Mathematical Foundation - 1	3	1	-	4	4	30	70	100
MCA 102	Introduction to Computing & C	3	1	-	4	4	30	70	100
MCA 103	Basic Electronics & Digital Logic	3	1	-	4	4	30	70	100
MCA104	Introduction to Management Functions	3	1	-	4	4	30	70	100
MCA 105	Communicative English & Business	2	2	-	4	4	10	40 (Gr. A)	100
	Presentation						10	40 (Gr. B)	(A+B)
Practical								•	
MCA 101L	C Programming Lab.	0	1	3	4	3	20	,P-60,V-20	100
MCA 102L	Digital Logic Lab.	0	1	3	4	3	20	,P-60,V-20	100
MCA 103L	Unix & Shell Programming Lab.	0	1	3	4	3	20	,P-60,V-20	100
						Total	Credit	: 29 Total Ma	ks: 800
		Part I,	2 <sup>nd</sup> Se	mester					
Paper	Dapor Namo	Weekly Contact Period (WCP)			0	Marks			
-	raper Maille	weekiy C	ontact	Period	(WCP)	Credit		Marks	
Code		Lecture	T	Period P	(WCP) Total	Credit	S	Marks Exam.	Total
Code Theoretical		Lecture	T	Period P	(WCP) Total	Credit	S	Marks Exam.	Total
Code Theoretical MCA 201	Data Structures	Lecture 3	T	Period P -	(WCP) Total	4	<b>S</b> 30	Marks Exam. 70	<b>Total</b>
Code Theoretical MCA 201 MCA 202	Data Structures Numerical & Statistical Computing	Lecture 3 3	T 1 1	Period P -	(WCP) Total 4 4	4 4	<b>S</b> 30 30	Marks Exam. 70 70	<b>Total</b> 100 100
Code Theoretical MCA 201 MCA 202 MCA 203	Data Structures Numerical & Statistical Computing Computer Organization & Architecture	Weekly C       Lecture       3       3       3	1 1 1	Period P - - -	(WCP) Total 4 4 4	4 4 4	<b>S</b> 30 30 30	Marks           Exam.           70           70           70           70	<b>Total</b> 100 100 100
Code Theoretical MCA 201 MCA 202 MCA 203 MCA 204	Data Structures Numerical & Statistical Computing Computer Organization & Architecture Microprocessor	Weekiy C       Lecture       3       3       3       3       3	1 1 1 1	Period P - - - -	(WCP) Total 4 4 4 4	4 4 4 4 4	<b>S</b> 30 30 30 30	Marks Exam. 70 70 70 70 70	<b>Total</b> 100 100 100 100
Code Theoretical MCA 201 MCA 202 MCA 203 MCA 204 MCA 205	Data Structures Numerical & Statistical Computing Computer Organization & Architecture Microprocessor Mathematical Foundation II	Weekiy C       Lecture       3       3       3       3       3       3       3	T           1           1           1           1           1           1           1           1	Period P - - - - -	(WCP) Total 4 4 4 4 4 4 4	4 4 4 4 4 4	<b>S</b> 30 30 30 30 30 30	Marks Exam. 70 70 70 70 70 70 70	Total           100           100           100           100           100           100           100
Code Theoretical MCA 201 MCA 202 MCA 203 MCA 204 MCA 205 Practical	Data Structures Numerical & Statistical Computing Computer Organization & Architecture Microprocessor Mathematical Foundation II	3       3       3       3       3       3       3	1           1           1           1           1           1           1	Period P - - - - - -	(WCP) Total 4 4 4 4 4 4 4	4 4 4 4 4 4	<b>S</b> 30 30 30 30 30 30	Marks           Exam.           70           70           70           70           70           70           70           70           70           70           70	Total           100           100           100           100           100           100
Code Theoretical MCA 201 MCA 202 MCA 203 MCA 204 MCA 205 <b>Practical</b> MCA 201L	Data Structures           Data Structures           Numerical & Statistical Computing           Computer Organization & Architecture           Microprocessor           Mathematical Foundation II           Data Structures Lab.	Weeky C           Lecture           3           3           3           3           3           3           0	1           1           1           1           1           1           1           1           1           1	Period P - - - - - - 3	(WCP) Total 4 4 4 4 4 4 4 4	4 4 4 4 4 4 3	<b>S</b> 30 30 30 30 30 20	Marks Exam. 70 70 70 70 70 70 70 ,P-60,V-20	Total           100           100           100           100           100           100           100           100           100
Code           Theoretical           MCA 201           MCA 202           MCA 203           MCA 204           MCA 205           Practical           MCA 201L           MCA 202L	Data Structures           Data Structures           Numerical & Statistical Computing           Computer Organization & Architecture           Microprocessor           Mathematical Foundation II           Data Structures Lab.           Numerical Lab.	Weeky c           Lecture           3           3           3           3           3           0           0           0	I           1           1           1           1           1           1           1           1           1           1	Period P - - - - - 3 3	(WCP) Total 4 4 4 4 4 4 4 4 4 4 4	Credit 4 4 4 4 4 4 3 3 3	<b>S</b> 30 30 30 30 30 20 20	Marks Exam. 70 70 70 70 70 70 70 70 ,P-60,V-20 ,P-60,V-20	Total           100           100           100           100           100           100           100           100           100           100

Part II, Ist Semester									
Paper	Paper Name	Weekly C	ontact	Period	(WCP)	Credit		Marks	
Code		Lecture	Т	Р	Total		S	Exam	Total
Theoretical									
MCA 301	Database Management Systems	3	1	-	4	4	30	70	100
MCA 302	Operating Systems	3	1	-	4	4	30	70	100
MCA 303	Theory of Computing	3	1	-	4	4	30	70	100
MCA 304	Object Oriented Programming	3	1	-	4	4	30	70	100
MCA 305	Analysis & Design of Algorithm	3	1	-	4	4	30	70	100
Practical									
MCA 301L	DBMS Lab	0	1	3	4	3	20	P-60,V-20	100
MCA 302L	OOPs Lab	0	1	3	4	3	20	P-60,V-20	100
MCA 303L	System Software Lab	0	1	3	4	3	20	P-60,V-20	100
Total Credit:29 Total Marks: 800									

Part II, 2 <sup>nd</sup> Semester									
Paper	Paper Name	Weekly C	ontact	Period	(WCP)	Credit		Marks	
Code		Lecture	Т	Р	Total		S	Exam	Total
Theoretical									
MCA 401	Computer Graphics	3	1	-	4	4	30	70	100
MCA 402	Java & Web Technology	3	1	-	4	4	30	70	100
MCA 403	Computer Networks	3	1	-	4	4	30	70	100
MCA 404	Software Engineering	3	1	-	4	4	30	70	100
MCA 405	Artificial Intelligence	3	1	-	4	4	30	70	100
Practical									
MCA 401L	Graphics Lab.	0	1	3	4	3	20	P-60,V-20	100
MCA 402L	Java & Web Technology Lab.	0	1	3	4	3	20	P-60,V-20	100
MCA 403L	AI Lab.	0	1	3	4	3	20	P-60,V-20	100
						Tot	al Cre	dit:29 Total Mar	ks: 800

Paper	Paper Name	Weekly Contact Period (WCP) (			Credit		Marks		
Code		Lecture	Т	Р	Total		S	Exam	Total
Theoretical									
MCA 501	Digital Image Processing	3	1	-	4	4	30	70	100
MCA 502	Elective I	3	1	-	4	4	30	70	100
MCA 503	Elective II	3	1	-	4	4	30	70	100
MCA 504	Elective III	3	1	-	4	4	30	70	100
MCA 505	Elective IV	3	1	-	4	4	30	70	100
Practical	* R-Repor	t, P- Preser	itation	, V - Viv	a				
MCA 501L	Image Processing lab.	0	1	3	4	3	20	,P-60,V-20	100
MCA 502L	Web based DBMS Lab.	0	1	3	4	3	20	,P-60,V-20	100
MCA 503P	Project I(Minor)	0	0	4	4	3		P-60,V-20	100
	Total Credit:29 Total Marks: 800								

	Part III, 2 <sup>nd</sup> Semester									
Paper Code	Paper Name	Weekly Contact Period (WCP)		Credit		М	arks			
		Lecture	Т	Ρ	Total		Report	Presentation	Viva	Total
Dissertation										
MCA-CS-601	Project II (Project Work & Presentation + Viva )	-	-	24	24	16	200	100	100	400
MCA-IT-601	Grand Viva	-	-	-	-	8	-	-	200	200
						Total	Credit	:: 24	Total Ma	rks: 600

Total Marks for Three Year M.C.A. (6-Semesters) Course is 4600, Total Credit is 169.

For sessional at least two intermediate examinations are to be taken, average mark will be the sessional marks for each subject. Corrected paper of these intermediate exams are to be returned to the respective students.

#### #T-Tutorial, P-Practical, S-Sessional, Th-Theory, A-Asignment, R-Report, P-Presentation, V-Viva

Elective Papers	Elective Papers	Elective Papers
<ul> <li>MCA-E/01 Soft Computing</li> </ul>	MCA-E/08 VLSI Design	MCA-E/15 Advance Data Structure
<ul> <li>MCA-E/02 Pattern Recognitions</li> </ul>	<ul> <li>MCA-E/09 Managerial Economics</li> </ul>	MCA-E/16 Network Programming
<ul> <li>MCA-E/03 Advanced DBMS</li> </ul>	<ul> <li>MCA-E/10 Computational Geometry</li> </ul>	MCA-E/17 Remote Sensing & GIS Applications
<ul> <li>MCA-E/04 Parallel Processing</li> </ul>	<ul> <li>MCA-E/11 Data Mining</li> </ul>	MCA-E/18 Network Security
MCA-E/05 Embedded System Design	<ul> <li>MCA-E/12 Distributed Computing</li> </ul>	MCA-E/19 Real Time Operating Systems
MCA-E/06 Simulation & Modeling	<ul> <li>MCA-E/13 Compiler Design</li> </ul>	<ul> <li>MCA-E/20 Multi Object Optimization Technique</li> </ul>

## • Academic Calendar of the University

1 <sup>st</sup> Semester Academic Session 2018-2020				
Commencement of classes	25 <sup>th</sup> July, 2018			
1 <sup>st</sup> Assessment	Commences from 9 <sup>th</sup> October, 2018			
2 <sup>nd</sup> Internal Assessment	Commences from 4 <sup>th</sup> December,2018			
Dissolution of Classes	24 <sup>th</sup> December, 2018			
End term Examination to be completed by	18 <sup>th</sup> January, 2019			
Publication of Results	31 <sup>st</sup> January, 2019			

2nd Semester Academic Session 2018-2020				
Commencement of classes	24 <sup>th</sup> January, 2019			
1 <sup>st</sup> Internal Assessment	Commences from 26 <sup>th</sup> March, 2019			
2 <sup>nd</sup> Internal Assessment	Commences from 30 <sup>th</sup> April, 2019			
Dissolution of Classes	17 <sup>th</sup> may, 2019			
End term Examination to be completed by	17 <sup>th</sup> June, 2019			
Publication of Results	15 <sup>th</sup> July, 2019			

3rd Semester Academic Session 2017-2019				
Commencement of classes	25 <sup>th</sup> July, 2018			
1 <sup>st</sup> Internal Assessment	Commences from 3 <sup>rd</sup> Oct., 2018			
2 <sup>nd</sup> Internal Assessment	Commences from 26 <sup>th</sup> Nov., 2018			
Dissolution of Classes	3 <sup>rd</sup> January, 2019			
End term Examination to be completed by	25 <sup>th</sup> Jan., 2019			
Publication of Results	5 <sup>th</sup> February, 2019			

4th Semester Academic Session 2017-2019					
Commencement of classes	24 <sup>th</sup> January, 2019				
1 <sup>st</sup> Internal Assessment	Commences from 28th March., 2019				
2 <sup>nd</sup> Internal Assessment	Commences from 2 <sup>nd</sup> May, 2019				
Dissolution of Classes	22 <sup>nd</sup> May, 2019				
End term Examination to be completed by	17 <sup>th</sup> June, 2019				
Publication of Result	5 <sup>th</sup> July, 2019				

	Courses	10.15am — 11.05am	11.05am  12.00pm	12.00pm  12.55pm		1.30pm  2.25pm	2.25pm 	3.20pm 	4.15pm 
	M.Tech Part-I	CSE 201L (JKM/DS/UB)	CSE 201L (JKM/DS/UB)	CSE 201L (JKM/DS/UB)		CSE 201 (JKM)	CSE 201 (JKM)	and a second	
Mon	M.C.A. Part-I	MCA 201(PRS)	MCA 201 (PRS)	MCA 201L (PRS)		MCA 201 L(PRS)	MCA 201 L (PRS)	MCA 205 (AG)	MCA 205 (AG)
	M.C.A. Part-II	MCA 402L (SM)	MCA 402L (SM)	MCA 402L (SM)	12.3	MCA 401 (KM)	MCA 401 (KM)	MCA 402 (SM)	MCA 402 (SM)
	M.Tech Part-I	CSE 201L (JKM/DS/UB)	CSE 201L (JKM/DS/UB)	CSE 201L (JKM/DS/UB)	R	CSE 204E (KM/JKM)	CSE 204E (KM/JKM)	CSE 203 (IB)	CSE 203 (IB)
Tue	M.C.A. Part-I		MCA 203 (SM)	MCA 203 (SM)		MCA 203L (UB)	MCA 203L (UB)	MCA 203L (UB)	1
	M.C.A. Part-II	MCA 401 (KM)	MCA 401 (KM)	MCA 403L (PB/AM)	E	MCA 403L (PB/AM)	MCA 403L (PB/AM)	MCA 403 (KD)	MCA 403 (KD)
	M.Tech Part-I	CSE 202 (DS)	CSE 202 (DS)	CSE 204E (KM/JKM)		CSE 204E (KM/JKM)	CSE 201 (JKM)	CSE 201 (JKM)	
Wed	M.C.A. Part-I		MCA 204 (UB)	MCA 204 (UB)	с	MCA 202 (SB)	MCA 202 (SB)	Special Class on Programming	Special Class on Programming
	M.C.A. Part-II		MCA 405 (AM)	MCA 405 (AM)	E	MCA 404 (DS)	MCA 404 (DS)	Special Class on Programming	Special Class on Programming
	M.Tech Part-I	×4	CSE 205E (AM)	CSE 205E (AM)		CSE 202 (DS)	CSE 202 (DS)		
Thu	M.C.A. Part-1		MCA 201 (PRS)	MCA 201 (PRS)	e	MCA 204 (UB)	MCA 204 (UB)	MCA 202 (SB)	MCA 202 (SB)
	M.C.A. Part-II	MCA 403 (KD)	MCA 403 (KD)	MCA 402 (SM)	0	MCA 402 (SM)	MCA 405 (AM)	MCA 405 (AM)	
5	M.Tech Part-1	1	CSE 205E (AM)	CSE 205E (AM)			CSE 203 (IB)	CSE 203 (IB)	
Fri	M.C.A. Part-I	MCA 202L (PRS)	MCA 202L (PRS)	MCA 202L (PRS)	S	MCA 203 (SM)	MCA 203 (SM)	MCA 205 (AG)	MCA 205 (AG)
	M.C.A. Part-II		MCA 404 (DS)	MCA 404 (DS)		' MCA 401L (KM)	MCA 401L (KM)	MCA 401L (KM)	
194	M.Tech. Part-I						91		
Sat	M.C.A. Part-1			0			and the second second second		
	M.C.A. Part-II		and the second	& subout	٩Y	Department - Co	Head	de la company de la company	ardina ing pangangan karia

## • Academic Time Table with the name of the Faculty members handling the Course

Department of Computer Science and Engineering

## • Teaching Load of each Faculty

Faculty Name	Number of Classes per Week
Jyotsna Kumar Mandal	14
Utpal Biswas	10
Priya Ranjan Sinha Mahapatra	10
Anirban Mukherjee	11
Kalyani Mali	9
Debabrata Sardar	14
Sukanta Majumdar	11

- Internal Continuous Evaluation System and place:
- Student's assessment of Faculty, System in place: NA

## 16. Enrollment of Students in last 3 years:

Course	Session	Enrolled Students
MCA	2018-2019	23

	2017-2018	24
	2016-2017	27
MTech(CSE)	2018-2019	16
	2017-2018	11
	2016-2017	17

## 17. List of Research Projects/ Consultancy Works:

• Number of Projects carried out, funding agency, Grant received:

Name of the Investigator	Title of the project and	Amount	Funding Agency
	duration	sanctioned	
Dr. Priya Ranjan Sinha	Variation of Enclosing	Rs. 13.39	Dept. of Atomic
Mahapatra	Problem using Geometric	lakh	Energy (NBHM),
	Objects (2015-2018)		Govt. of India
Dr. Anirban Mukhopadhyay	Developing Computational	Rs. 8.61 lakh	Dept. of Science &
	Techniques and Databases		Technology and
	for Prediction and Analysis		Biotechnology,
	of Host-Pathogen Protein-		Govt. of West
	Protein Interactions Involved		Bengal
	in Neglected Tropical		-
	Diseases		

- Publications (if any) out of research in last three years out of masters projects:
  - 1. S. Chatterjee, E. Kundu and **A. Mukhopadhyay**, "<u>A Markov Chain based Ensemble</u> <u>Method for Crowdsourced Clustering</u>", In WiP Track of The Fourth AAAI Conference on Human Computation and Crowdsourcing (HCOMP-2016), Austin, TX, USA, October-November 2016
  - 2. Sujit Das , Jyotsna Kumar Mandal2, Arundhati Bhowal," Bit Plane Based Image Authentication in Spatial Domain", International Journal of Computer Sciences and Engineering, Vol.7, Jan 2019.

3.

- Industry Linkage: NONE
- MoUs with Industries: NONE

## 18. EOA Reports Till date:

## 19. Account audited statement :

	Income			Expenditure		
SI.No.	Details	Amount	SI.No.	Details	Amount	
1	Tuition Fee	14437294	1	Salary	535764000	
2	Other Fee/amount collected from students	77310000	2	Administrative Expenses	157875000	
3	Grants from Govt./Private agencies	688606000	3	Training and Development	5650000	
4	Grants/Contribution from other sources (Management)	144706093	4	Laboratory Consumables	13518204	
5	Scholarships Received	0	5	Library	6428768	
6	Other Income	15519000	6	Travel	1250000	
7	Any other Receipts (Research & Project Scheme)	119811438	7	Fees paid to University/Board/Government/AICTE/UGC	75000	
		1. 6 C. 1 8 . 4 .	8	Repair and Maintenance	164279531	
			9	Scholarships/Concessions/Fellowships/Hono rarium etc. awarded/incurred (other than Govt.Grants)	с	
			10	Expenditure of grants received from Govt./Private agencies	C	
			11	Depreciation	0	
			12	Any other Expenditure (Research & Project Scheme)	126662109	
		1060389825			1011502612	

#### Audited Statement of Account of 2016-17 (Income & Expenditure Statement for Complete Year)



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		UNIVERSIT	YOF	ALYANI			
	Income & Expenditure Statement for 2017-18						
	Income		Expenditure				
SI. No.	Details	Amount	SI. No.	Details	Amount		
1	Tuition Fees	15237580.00	1	Salary & Pension (including retirement benefit)	598164919.00		
2	Other fee/amount collected from students	87252453.00	2	Administrative expenses	156671738.00		
3	Grants from Govt. / Private agencies	788814413.00	3	Training and Development	793374.00		
4	Grants / Contribution from other sources (Management)		4	Laboratory consumables	22155969.00		
5	Scholarships received	11740581.00	5	Library	8431046.00		
6	Other income	79582929.00	6	Travel	860575.00		
			7	Fees Paid to University/ Board/ Government/AICTE/UGC			
	V		8	Repairs and Maintenance	21297028.00		
			9	Scholarships/ Concessions/ Fellowships/Honorarium etc., awarded/incurred(other than Govt. grants)	11740581.00		
			10	Expenditure of grants received from Govt. / Private agencies	. 64207339.00		
			11	Depreciation	14325141.00		
			12	Any other expenditure	70717856.00		
	Tota	982627956.00		Total	969365566.00		

Finance Officer University of Kalvani

#### 20. Best Pratices adopted, if any:

The department is involved in many innovative ideas, practices and extension activities. Some important

activities are as follows:

- The department has a dedicated website (http://kucse.in) and a Facebook page.
- The department takes students' feedback on different courses at the end of each semester through online portal.
- The syllabi of each course is updated on regular basis to accommodate latest updates and facilitate qualifying in NET/SET examinations.
- Modern teaching aids like LCD projectors are used in classes.
- The department houses a Finishing School funded by Govt. of West Bengal, where different training programs are conducted for school teachers of Nadia and Murshidabad district.
- All the old computers of the department are given to other departments of the university for their use.